



**UNITED STATES AIR FORCE  
INSTALLATION RESTORATION PROGRAM  
KELLY AIR FORCE BASE  
SAN ANTONIO, TEXAS**

## **BUILDING 1592 AREA HUMAN HEALTH RISK ASSESSMENT OF SURFACE SOIL**

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### **EXECUTIVE SUMMARY**

Kelly Air Force Base (AFB), in response to community concerns, undertook a proactive investigation of surface soil in the Building 1592 Area. Both the sample collection and the risk assessment were performed in direct response to public concerns and are not mandated by any Federal and/or State requirements.

The Building 1592 Area is located on the north side of Zone 5 at Kelly AFB and is bordered by the North Kelly Gardens neighborhood to the north, West Thompson Place to the south, the base boundary to the east, and Building 1598 to the west (refer to Figure ES-1). The area consists of approximately 40 acres composed of grass, concrete, and gravel. Building 1592 is not a source of contamination; it is one of two buildings in the area and is used to identify the area. This building is the electrical control room for the hydrant system and supplies power to a portion of the facility lights and pumps. The Building 1592 Area sampling extent was designed to surround a former storage area (i.e., Site S-1). Site S-1 was an intermediate storage area for waste to be reclaimed off-base and also was the location of a spoil area for scrap metal and a temporary transformer storage site. The waste tanks often overflowed and spills occurred and collected in a depression on the site (HNUS 1994a). Site S-1 was used from the early 1960s to 1973 and was regraded after its abandonment and removal of tanks. Presently, Site S-1 consists primarily of a grass-covered field with the eastern one-third of the site covered by gravel.

### **Investigation Approach**

A total of 120 surface soil samples were collected from the Building 1592 Area in November 1996 and February 1997 and analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, and metals. The samples were grid spaced over the entire area in accordance with the *Sampling and Analysis Plan, Surface Soil Sampling, Bldg. 1592 Area* (Kelly AFB 1996). Sampling results were used to develop a risk assessment conducted in accordance with guidance from the U.S. Environmental Protection Agency (USEPA) and the Texas Natural Resource Conservation Commission (TNRCC). During sampling, the presence of fill material (i.e., limestone, pea gravel, asphalt, glass, or concrete) was observed in some locations along Growdon Road and other low-lying areas. Because members of the community were concerned that samples containing fill material may not be representative of historical contamination, two risk evaluations were conducted: (1) risk from surface soil containing no fill (the *Black Clay Data Set*) and (2) risk from all surface soil samples collected (the *Comprehensive Data Set*).

The risk assessment incorporated a data review process that consisted of (1) assessing the frequency of detection, (2) eliminating common nutrients not likely to contribute to risk, and (3) comparing site-related Inorganic contamination to background concentrations. As a result of this review, one organic (pyrene), one polychlorinated biphenyl (PCB-1260), and 15 inorganics (antimony, arsenic, barium, cadmium, cobalt, copper, cyanide, lead, manganese, mercury, nickel, selenium, silver, thallium, and zinc) were identified as chemicals of potential concern (COPCs) and were evaluated in the risk assessment.

To characterize those who might possibly be exposed to contaminants, currently or in the future, in the Building 1592 Area, five types of individuals were described. These individuals include:

A youth, age 7-12 years old who occasionally visits the site once a week for 5 years to play. While on the site, the youth contacts the soil with his/her skin, ingests soil, and inhales dust.

A maintenance worker who visits the site once a week for 25 years. While on the site, the maintenance worker contacts the soil with his/her skin, ingests soil, and inhales dust.

A child, age 0-6 years old, who lives on the site 350 days a year for 6 years of residence. The child contacts the soil with his/her skin, ingests soil, and inhales dust.

An adult who lives on the site 350 days a year for 24 years. The adult contacts the soil with his/her skin, ingests soil, and inhales dust.

An industrial worker who visits the site 250 days a year for 25 years. The industrial worker contacts the soil with his/her skin, ingests soil, and inhales dust.

Information about the carcinogenic and noncarcinogenic health effects for the COPCs were obtained from the USEPA to conduct this risk assessment (USEPA

1997a and USEPA 1997b). Potential carcinogenic effects are characterized by an estimation of the probability that an individual will develop cancer over a lifetime. The probability, or risk, of developing cancer is calculated from projected lifetime daily intake of chemicals multiplied by the chemical-specific dose-response data (slope factors). Noncancer adverse health effects are evaluated using a chemical-specific reference dose. The intake level of the site contaminant is compared to the reference dose in a ratio called the Hazard Index (HI).

The results of the risk assessment are summarized in Table ES-i. There are no carcinogenic risks greater than  $1 \times 10^{-6}$  and no HI values greater than 1. The USEPA's guidelines state that the total incremental carcinogenic risk for an individual should not exceed a range of  $1 \times 10^{-6}$  to  $1 \times 10^{-5}$  and that the HI should not exceed 1 (USEPA 1990). Therefore, cancer and noncancer adverse health effects from exposure to surface soil at this site are unlikely to occur.

**Table ES-1**

**Summary of Cancer Risks and Hazard Indices from Surface Soil**  
*Kelly AFB, Building 1592 Area Human Health Risk Assessment 1997*

Exposure receptors	Total excess lifetime cancer risks		Hazard indices	
	Comprehensive Data Set	Black Clay Data Set	Comprehensive Data Set	Black Clay Data Set
<b>Surface soil</b>				
Recreational youth	2E-07	2E-07	0.02	0.03
Maintenance worker	4E-07	4E-07	0.02	0.02
Residential adult	1E-05	2E-05	0.1	0.2
Residential child	-	-	0.6	0.6
Industrial worker	2E-06	2.E-06	0.07	0.08

Notes:

Refer to Appendix C for the pathway, chemical-specific risk calculations.

E=exponent of base 10, 1E-04=  $1 \times 10^{-4}$  or 0.0001.

Carcinogenic risks to a child are added to the adult exposure for the total residential cancer risk.

Lead does not have a reference dose. However, the USEPA has established a target blood lead value of 10 micrograms per deciliter and developed a method for estimating the blood lead level of children after exposure to lead in the environment. This method was used to evaluate the lead risk to a child resident in the Building 1592 Area. This lead evaluation assumes a residential exposure and represents a conservative overestimate for nearby residents. Building 1592 Area was divided into 4 cells or zones for evaluation of lead risk. Using the suggested method default parameters, there were no blood levels exceeding 10 micrograms per deciliter. There is no evidence of increased risk from soil located outside the Kelly AFB fence along Growdon Road. Assuming maximum exposure conditions (i.e., using reasonable maximum estimates of soil lead levels and soil ingestion rates), the cell containing the former storage area (Site S-1) shows the blood lead level exceeding the target value of 10 micrograms per deciliter.

The 95% upper confidence limit (UCL) lead levels for all of the cells were less than levels established by the TNRCC for the protection of pregnant workers and unborn children.

## **Conclusions**

There are no excessive adverse health risks posed by the chemicals present in surface soil in the Building 1592 Area. Soil lead levels in the Site S-I Area may result in high blood lead levels only for a child who lives on Site S-1 for 6 years and ingests soil from the unremediated area. The soil lead level in the Site S-I Area is below screening risk levels established by the TNRCC for pregnant worker protection. Areas outside of Site S-1 pose no excessive risk from lead in soil. The Building 1592 Area land use currently is industrial and the future land-use considerations continue the industrial use of the area.